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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
09/786,977	06/07/2001	Koji Takahashi	299002052200	7953

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EXAMINER

BROPHY, JAMIE LYNN

ART UNIT	PAPER NUMBER
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2822

DATE MAILED: 12/04/2002

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary

Application No.

09/786,977

Applicant(s)

TAKAHASHI ET AL.

Examiner

J. L. Brophy

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-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --
Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133).
- Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 07 June 2001.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-33 is/are pending in the application.
- 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 1-23, 26-31 and 33 is/are rejected.
- 7) ☒ Claim(s) 24, 25 and 32 is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 07 June 2001 is/are: a) ☒ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
- 11) ☐ The proposed drawing correction filed on _____ is: a) ☐ approved b) ☐ disapproved by the Examiner.
If approved, corrected drawings are required in reply to this Office action.
- 12) ☐ The oath or declaration is objected to by the Examiner.

Priority under 35 U.S.C. §§ 119 and 120

- 13) ☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☒ All b) ☐ Some * c) ☐ None of:
1. ☒ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. _____.
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).
- * See the attached detailed Office action for a list of the certified copies not received.
- 14) ☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. § 119(e) (to a provisional application).
- a) ☐ The translation of the foreign language provisional application has been received.
- 15) ☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. §§ 120 and/or 121.

Attachment(s)

- 1) ☒ Notice of References Cited (PTO-892)
- 2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
- 3) ☒ Information Disclosure Statement(s) (PTO-1449) Paper No(s) 7.
- 4) ☐ Interview Summary (PTO-413) Paper No(s). _____
- 5) ☐ Notice of Informal Patent Application (PTO-152)
- 6) ☐ Other:

DETAILED ACTION

This office action is in response to the application papers filed 6/7/01.

Claim Objections

Claims 10-18 are objected to because of the following informalities: at the end of claim 10, there are two extraneous lines (top of p. 60). The two lines at the top of p. 60 do not belong to any of the claims and should be deleted. Appropriate correction is required.

Claim Rejections - 35 USC § 102

The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

(e) the invention was described in-

(1) an application for patent, published under section 122(b), by another filed in the United States before the invention by the applicant for patent, except that an international application filed under the treaty defined in section 351(a) shall have the effect under this subsection of a national application published under section 122(b) only if the international application designating the United States was published under Article 21(2)(a) of such treaty in the English language; or
(2) a patent granted on an application for patent by another filed in the United States before the invention by the applicant for patent, except that a patent shall not be deemed filed in the United States for the purposes of this subsection based on the filing of an international application filed under the treaty defined in section 351(a).

Claims 1-5, 9-14, 18-23 and 29-31 are rejected under 35 U.S.C. 102(b) as being anticipated by Major et al (5,689,123).

Major et al teach a method for forming a compound semiconductor layer, comprising the step of crystal-growing a group III-V compound semiconductor layer containing at least nitrogen and arsenic as group V elements on a single crystal substrate (Fig. 10 and col. 14, lines 54-58),

Wherein the step of crystal-growing the compound semiconductor layer includes the step of supplying an aluminum source material to the single crystal substrate concurrently with a nitrogen source material or separately from the nitrogen source material (col. 12, lines 42-50),

Wherein an aluminum-mix crystal ratio in a group III element in the compound semiconductor layer is 0.02 or higher (col. 14, line 57),

Wherein the step of crystal-growing the compound semiconductor layer is performed at a temperature of the single crystal substrate in the range of 500°C or higher and 750°C or lower (col. 12, lines 58-62),

Wherein the nitrogen source material contains NH_3 or H_2NNH_2 (col. 12, lines 14-26),

Wherein more than 0% and less than 50% of the crystal growth surfaces of the compound semiconductor layer is covered with group V atoms (col. 12, lines 58-59 and col. 13, lines 3-5),

Wherein the compound semiconductor layer further contains indium (col. 13, lines 3-5), and

Wherein a light emitting layer includes the compound semiconductor layer (col. 3, line 59 through col. 4, line 28).

Claims 30, 31 and 33 are rejected under 35 U.S.C. 102(e) as being anticipated by Sugiura et al (6,204,084).

Sugiura et al teach a compound semiconductor apparatus, comprising at least one group III-V compound semiconductor layer containing at least Al as a group III element and containing at least N and As as group V elements (6, line 60),

Wherein the compound semiconductor apparatus is a light emitting device including at least a light emitting layer, and the light emitting layer includes the compound semiconductor layer (col. 1, lines 10-15), and

Wherein the light emitting device further includes a cladding layer, a guide layer and/or a barrier layer formed of $\text{Al}_h\text{Ga}_i\text{In}_{1-h-i}\text{As}_j\text{P}_{1-j}$ (col. 6, line 60 through col. 7, line 9).

Claim Rejections - 35 USC § 103

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

Claims 1, 6-8, 10, 15-17, 19 and 26-28 rejected under 35 U.S.C. 103(a) as being unpatentable over Sugiura et al in view of Major et al.

Sugiura et al teach a method for forming a compound semiconductor layer, comprising the step of crystal-growing a group III-V compound semiconductor layer containing at least nitrogen and arsenic as group V elements on a single crystal substrate, and

Crystal-growing a layer formed of $\text{Al}_h\text{Ga}_i\text{In}_{1-h-i}\text{As}_j\text{P}_{1-j}$ on the single crystal substrate, wherein the step of crystal-growing the compound semiconductor layer and

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the step of growing the crystal formed of $\text{Al}_h\text{Ga}_i\text{In}_{1-h-i}\text{As}_j\text{P}_{1-j}$ are performed at the same temperature,

Wherein the step of crystal-growing the compound semiconductor layer is performed before and/or after the step of crystal-growing the layer formed of $\text{Al}_h\text{Ga}_i\text{In}_{1-h-i}\text{As}_j\text{P}_{1-j}$.

See col. 6, lines 55-67 and col. 18, lines 10-14).

However, Sugiura et al do not specifically teach that the step of supplying an aluminum source material to the single crystal substrate may be performed concurrently with or separately from the step of supplying the nitrogen source material.

Major et al teach a method that comprises supplying an aluminum source material to the single crystal substrate concurrently with or separately from the step of supplying the nitrogen source material (col. 12, lines 42-50).

It would have been obvious to a person of ordinary skill in the art at the time the invention was made to modify the method disclosed by Sugiura et al by supplying an aluminum source material concurrently with or separately from supplying the nitrogen source material in order to form a crystal having desired concentrations of elements (see Major et al, col. 12, lines 37-40).

Allowable Subject Matter

Claims 24, 25 and 32 objected to as being dependent upon a rejected base claim, but would be allowable if rewritten in independent form including all of the limitations of the base claim and any intervening claims.

The following is an examiner's statement of reasons for allowance: none of the references of record teach all of the process limitations as claimed. Specifically, re claims 24 and 25, none of the references teach a method that comprises sequentially performing the following steps: supplying the group III source material, supplying the nitrogen source material, and supplying the arsenic source material, in combination with the other claim limitations. Re claim 32, none of the references teach a device that comprises a light emitting layer formed of $\text{Al}_x\text{Ga}_y\text{In}_{1-x-y}\text{N}_z\text{As}_{1-z}$, wherein the Al-mix crystal ratio x in the light emitting layer is between 0.02 and 0.2, in combination with the other claim limitations.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to J. L. Brophy whose telephone number is (703) 308-6182. The examiner can normally be reached on M-F (8:00-5:00).

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Amir Zarabian can be reached on (703) 308-4905. The fax phone numbers for the organization where this application or proceeding is assigned are (703) 872-9318 for regular communications and (703) 872-9319 for After Final communications.

Any inquiry of a general nature or relating to the status of this application or proceeding should be directed to the receptionist whose telephone number is (703) 308-0956.

Q.L.B.

jlb

November 25, 2002


AMIR ZARABIAN
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